

THE CLAIMS

We claim:

5 1. A method of forming a golf ball comprising the steps of:

- a) forming a golf ball core;
- b) forming an inner cover layer around said golf ball core with a material having a first shore D hardness; and
- c) casting an outer cover layer around said inner cover layer and golf ball core

10 with a thermoset material having a second shore D hardness less than the first.

2. The method of claim 1 wherein the step of casting the outer layer comprises:

- a) mixing a prepolymer and a curing agent;
- b) filling mold halves with the prepolymer and curing agent;
- c) reacting the prepolymer and curing agent to form a polyurethane outer layer having a thickness of less than about 0.05 inches.

15 3. The method of claim 1 wherein the inner cover layer is formed of a material having a shore D hardness that is about 5 to about 50 greater than the shore D hardness of the thermoset material forming the outer cover layer.

20 4. The method of claim 2 wherein the inner cover layer is formed of a material having a shore D hardness that is about 19 to about 39 greater than the shore D hardness of the thermoset material forming the outer cover layer.

25 5. The method of claim 3 wherein the inner cover layer is formed of a material having a shore D hardness that is about 25 to about 32 greater than the shore D hardness of the thermoset material forming the outer cover layer.

30 6. The method of claim 1 wherein the inner cover layer is formed from at least one material selected from the group consisting of an ionomer resin, a polyurethane, a

polyetherester, a polyetheramide, a polyester, a dynamically vulcanized elastomer, a functionalized styrene-butadiene elastomer, a metallocene polymer, nylon, and acrylonitrile-butadiene-styrene copolymer.

5 7. The method of claim 1 wherein the inner cover layer comprises an acid-containing copolymer ionomer formed by providing a cross metallic bond to polymers of a monoolefin having at least one member selected from the group consisting of unsaturated mono- or di-carboxylic acids having 3 to 12 carbon atoms and esters thereof so that said polymers contain about 1 to about 50 percent weight of the mono- or di-carboxylic acid and/or ester
10 thereof.

15 8. The method of claim 7 wherein the acid-containing copolymer ionomer comprises E/X/Y copolymers, where E is ethylene, X is a softening comonomer, and Y is acrylic or methacrylic acid.

15 9. The method of claim 7 wherein the acid-containing copolymer ionomer is formed by at least one cation selected from the group consisting of lithium, sodium, potassium, magnesium, calcium, barium, lead, tin, zinc or aluminum.

20 10. The method of claim 1 wherein the outer cover layer thermoset material has a Shore D hardness in the range of about 30 to 60.

25 11. The method of claim 10 wherein the outer layer thermoset material has a Shore D hardness in the range of about 35 to 50.

25 12. The method of claim 1 wherein casting the outer cover layer comprises
 a) placing the golf ball core in a core holder;
 b) gelling the thermoset material in the first mold half;
 c) placing the golf ball core into the gelling thermoset material in the first mold
30 half;
 d) disengaging the golf ball core from the core holder after

a selected period of time;

e) placing the golf ball core, while still in said first mold half with the thermoset material against a second mold half having additional thermoset material and mating the two mold halves together; and

5 f) curing the thermoset material in the mated mold halves.

Sub A 13. The method of claim 12 further comprising the step of allowing the thermoset material to reside in the first mold half for about 50 to 80 seconds before the golf ball core is placed the thermoset material.

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14. The method of claim 12 further comprising the step of causing the golf ball core to contact the thermoset material at a rate such that substantially no air bubbles are created as the golf ball core contacts the thermoset material.

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15. The method of claim 12 wherein the viscosity of the thermoset material in the first mold half is about 2,000 cps to about 30,000 cps when the golf ball core is placed into the thermoset material.

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16. The method of claim 15 wherein the viscosity of the thermoset material in the first mold half is about 8,000 cps to about 15,000 cps when the golf ball core is placed into the thermoset material.

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17. The method of claim 1, wherein the outer cover layer has a thickness of less than about 0.05 inches.

18. The method of claim 1, wherein the thermoset material of the outer cover layer comprises at least one of a thermoset urethane, a polyurethane, a thermoset urethane ionomer, or a thermoset urethane epoxy.

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19. The method of claim 1 wherein forming the inner cover layer comprises compression molding the inner cover material.